

CLAIMS

1. Printed circuit board - PCB – having a through-hole between an upper side and a lower side of the PCB, comprising:

- 5 - at least one electronic component attached to the upper side,
- at least one heat-conducting member - HCM – for inserting into the through-hole, extending from the upper side to the lower side, and being thermally coupled with the component,
- 10 - the HCM comprising a substantially planar top portion and tapered or recessed bottom portion.

2. PCB according to claim 1, wherein:

- the through-hole is arranged substantially centrally underneath the component,
- 15 - a top side of the HCM is directly thermally coupled with a bottom side of the component.

3. PCB according to claim 1, wherein:

- 20 - the HCM comprises a disc-shaped top portion and a ring-shaped bottom portion extending from the top portion,
- the top portion is thermally coupled with the component.

4. PCB according to claim 3, wherein:

- 25 - the top portion comprises several projections radially extending from an outer edge of the top portion,

- the projections affix the HCM to the PCB by penetrating into an inner wall enclosing the through-hole.
5. PCB according to claim 3, wherein between the bottom portion and an inner wall enclosing the through-hole a ring shaped gap is provided.
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6. PCB according to claim 3, wherein the bottom portion has a final shape resulting from plastically deforming an origin shape of the bottom portion by pressing the HCM substantially perpendicular to the top portion by means of planar pressing tools (20, 25).
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7. PCB according to claim 1, with at least one of the features:
- a top side of the HCM is plainly aligned with the upper side of the PCB,
 - a bottom side of the HCM is plainly aligned with the lower side of the PCB.
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8. PCB according to claim 1, wherein the HCM has a substantially rotationally symmetrical shape.
9. PCB according to claim 1, wherein the HCM is thermally contacted with at least one of a heat sink and a cooling device preferably attached to the lower side of the PCB.
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10. Method for manufacturing a PCB, the method comprising the steps of:
- providing the PCB with at least one through-hole,
 - inserting a HCM into the through-hole, wherein the HCM comprises a substantially planar top portion and tapered or recessed bottom portion,
 - force fitting the HCM such that substantially only the areas turned away from the top side of the HCM are deformed and
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- providing the PCB with an electrical component such that the component is thermally coupled with the HCM.

11. Method according to claim 10, wherein the press fitting is controlled by force.

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12. Method according to claim 10, comprising the steps of:

- providing the HCM with an origin shape before it is force fitted into the through-hole, such that in the origin shape a distance between the top side of the HCM and the bottom side of the HCM is larger than a distance between the upper side of the PCB and the lower side of the PCB,
- performing the force fitting such that the HCM has a final shape after it is force fitted into the through-hole, such that in the final shape the distance between the top side and the bottom side of the HCM is substantially as big as the distance between the upper side and the lower side of the PCB.

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13. Method according to claim 12, wherein the origin shape of the HCM is chosen in at least one of the following ways:

- such that the distance between top side and bottom side of the HCM is larger than the largest value of a manufacturing tolerance range for allowable distances between upper side and lower side of the PCB,
- such that after press fitting of the HCM into the through-hole a ring-shaped gap is provided between a bottom portion of the final shape of the HCM and an inner wall enclosing the through-hole.

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14. Method according to any one of the claims 12, wherein the HCM is provided with a ring-shaped bottom portion which has a truncated conical profile tapering with increasing distance from a disc-shaped top portion of the HCM.

15. Method according to claim 10, wherein:

- the force fitting of the HCM into the through-hole is provided by a pressing device comprising a first pressing tool arranged at one side of the PCB, and a second pressing tool arranged at the opposing side of the PCB,
- the second pressing tool supports the PCB, while the first pressing tool presses the HCM into the through-hole as long as the first pressing tool contacts the respective side of the PCB.

16. Method according to claim 15, wherein:

- the first pressing tool is provided with a centering mandrill projecting from the first pressing tool and penetrating into a center cavity of the HCM for aligning the HCM with the through-hole,
- the centering mandrill is retracted into the first pressing tool before press fitting the aligned HCM into the through-hole.

17. Heat conducting member - HCM – for a printed circuit board - PCB – according to claim 1, wherein:

- the HCM has an origin shape before and a plastically deformed final shape after it is inserted into the through-hole of the PCB,
- the HCM has a disc-shaped top portion and a ring-shaped bottom portion extending from the top portion.

18. HCM according to claim 17, comprising at least one of the features:

- the top portion comprises several projections radially extending from an outer edge of the top portion;

- in the origin shape, the bottom portion has a truncated conical profile tapering with increasing distance from the top portion;
- the HCM has a substantially rotationally symmetrical shape;
- the HCM is made as a one-piece element.

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